Katherine Park and Lorraine Daston (eds), The Cambridge History of Modern Science. Volume 3: Early Modern Science (Cambridge: Cambridge University Press, 2006)

The Cambridge History of Science. Volume 3: Early Modern Science. Edited by KATHERINE PARK and LORRAINE DASTON. Pp. xxvii + 865, illus., index. Cambridge University Press: Cambridge. 2006. £90.00; $160.00. ISBN: 0-521-57244-4 (hbk).

This volume will immediately establish itself as required reading for everyone working on the history of science in the early modern period. I began to use it as soon as it arrived on my desk and have continued to consult it frequently. Its thirty-three articles, arranged in four major sections, all conform to the highest standards, and provide a superb overview of the fi eld. Part I provides a summation of the intellectual history of the period in four articles. Daniel Garber's "Physics and Foundations" outlines the major developments in ways of understanding nature from Aristotelianism through Renaissance eclecticism to the mechanical philosophy. The remaining three chapters in this part narrow their focus upon changes in the philosophical underpinning of attempts to understand the physical world. Lynn S. Joy explains the shift from formal causes to effi cient causes, and the increasing emphasis on the notion of laws of nature. Peter Dear focuses on changing attitudes to the value of experience, and R. W. Serjeantson gives an overview of theories of proof and legitimate argument in different disciplines, and how these changed as the disciplines themselves changed throughout the period.

Part II consists of eleven articles on some of the personnel involved in the study of the natural world, and the places where changes in the understanding of the world can be seen to have taken place. The range of places seems to cover nearly all the possibilities, from domestic settings to marketplaces and piazzas, from coffeehouses to courts, and sites of military technology to libraries, and more. The only omissions that occurred to me were monasteries (important sites for the study of alchemy, we learn elsewhere in the volume, p. 498) and astronomical observatories. The coverage of possible personnel is less comprehensive; monks, like their monasteries, are missing, and so are astronomers, together with all the other vast array of mathematical practitioners who have emerged in recent scholarship. Although print shops are discussed, there is nothing on wood-cutters or engravers and how their skills were deployed by authors or printers who needed to include illustrations in their works (although the article on "Art", in Part IV, mentions that "complex negotiations" were required between interested parties, including artists and blockcutters, p. 781).

Part III presents the reader with twelve chapters, each covering a different discipline or topic. Again, every one of these articles is excellent, providing a brief survey of its subject throughout the period. It has to be said, however, that there is a strong bias in this section, and therefore in the book as a whole, towards the physical sciences. Only Harold J. Cook's article on medicine and Paula Findlen's on natural history cover the life sciences. Consequently, achievements in human and comparative anatomy receive only fragmented and incomplete attention, partly in the article on medicine and partly in the article on art, and there is no discussion anywhere, so far as I can see, of developments in physiology (which was acquiring its current meaning in this period, following on from Jean Fernel's *Physiologia* of 1554). There is nothing on changes in ideas of generation (which were of the utmost importance in post-Cartesian developments in the mechanical philosophy). Similarly, there is no discussion of pneumatology or psychology, which had been signifi cant parts of traditional natural philosophy throughout the Middle Ages, but were subject to dramatic re-thinking in the early modern period.

Part IV is entitled “Cultural Meanings of Natural Knowledge” and provides convenient overviews of the relations between science and the domains of religion, literature, and visual art. There is also an excellent piece on issues arising from sex and gender, and another on the beginnings of colonial science and the role of science in establishing European self-identity, as superior to other civilisations. This probably covers the major areas, although I would have liked to see an article considering historiographical claims about “national styles” in science, and the possible relevance of differences between the nation states (which were, after all, characteristic of Western Europe) in the burgeoning of natural knowledge in the West. Similarly, it would have been useful to have an overview from an economic historian of economic factors in the transformation of natural knowledge during the period.

It should be clear from what I have said already that this survey volume is thoroughly and consistently excellent in its treatment of what it covers. Its only fault, if it can be called that, is that it is not comprehensive in its coverage. Perhaps this is unfair criticism, however. It is not, after all, meant to be an encyclopaedia, but an overview of the “state of the art” of historiography of science in the Renaissance and early modern periods. The editors had to divide the territory somehow and their choices have inevitably resulted in less than ideal treatments of topics here and there (either by being broken up into passing remarks throughout the volume, or by being omitted altogether). There is no discussion of geology, which has its beginning in this period in the work of Nicolas Steno and Robert Hooke, if not others, but it is easy to see why the editors would exclude it, and leave the discussion of geology for a later volume in the series. Similar points could be made about instrumentation and metrology. There is no discussion of the universal language schemes whose promoters were more often than not magically-inspired natural philosophers, but again, since such schemes no longer look like scientific endeavours to us, it is easy to see why the editors gave them no thought. By choosing to discuss printing not in its own right but through the perspective of the print shop as a location for the dissemination of natural knowledge, we are denied any discussion of early modern scholars’ seemingly negative attitudes to print. In spite of such flaws, the fact remains that those who are interested in Renaissance and early modern science, will need to consult this book to see what it has to say about their particular interests; only very rarely will such a consultation turn out to be a waste of time.

Those working in the history of chemistry should have no cause for complaint. Chemistry figures very prominently in the volume, and is thereby acknowledged as playing a crucially important part in the historical development of early modern science. Garber’s opening overview includes a section on the role of the “Chymical Philosophies” in the historical process of displacing Aristotelianism. Joy’s analysis of changes in ideas of scientifi c explanation makes it clear that, to a large extent, they stemmed from diffi culties in the Aristotelian system with regard to distinctions between what we would call chemical compounds, as opposed to mere mixtures, exposing the inadequacies of the concept of substantial forms. Part III includes a gem of an article specifi cally devoted to the shift “From Alchemy to ‘Chymistry’ “by William R. Newman, but chemical matters also crop up in Cook’s article on medicine, and in Brian P. Copenhaver’s article on magic. Chemistry also features prominently in Part II in Pamela H. Smith’s extremely useful article on “Laboratories,” and even appears in Adrian Johns’ article on Coffeehouses. All in all, *Ambix* readers should find much of value in this outstanding survey of the history of early modern science.

University of Edinburgh JOHN HENRY